Journal of Organizational Behavior, J. Organiz. Behav. **32**, 589–607 (2011)
Published online 15 December 2010 in Wiley Online Library (wileyonlinelibrary.com) **DOI**: 10.1002/job.731

What makes a creative day? A diary study on the interplay between affect, job stressors, and job control

CARMEN BINNEWIES[1]* AND SARAH C. WÖRNLEIN[2]
[1]*Institute of Psychology, University of Mainz, Germany*
[2]*Department of Psychology, University of Konstanz, Germany*

Summary Applying a within-person perspective to research on creativity at work, this diary study examined daily positive and negative affect (NA) in the morning as well as daily job stressors (time pressure and situational constraints) as predictors of daily creativity. In addition, the general level of job control was investigated as a cross-level moderator in these relationships. Hypotheses were tested in a sample of 90 interior architects ($N = 326$ days) who completed a general survey and two daily surveys over the course of one work week. Hierarchical linear modeling showed that a higher level of positive affect (PA) in the morning as well as an intermediate level of daily time pressure was related to higher daily creativity. Job control moderated relations between daily NA, daily situational constraints and daily time pressure (curvilinear effect) with daily creativity. Our results stress the importance of daily affect and daily job stressors as well as the moderating role of job control for daily creativity at work. Copyright © 2010 John Wiley & Sons, Ltd.

Keywords: creativity; dynamic performance; affective states; job stressors/demands; job control; diary study

Introduction

Creativity is an important topic in organizational behavior as it includes the generation of new and useful products, practices, services, or procedures (Amabile, 1996; George, 2008). Thereby, creativity is a key to organizational innovation, effectiveness, and survival, particularly when organizations need to adjust to fast changing environmental conditions and to take advantage of emerging opportunities (Oldham, 2003; Shalley, Zhou, & Oldham, 2004).

Within-person studies acknowledging creativity as a dynamic performance outcome that changes from day to day are sparse (for an exception see Amabile, Barsade, Mueller, & Staw, 2005). This is quite surprising as we intuitively understand that we are more creative on some days compared to others. Moreover, theorized predictors of creativity, such as affect and job stressors have already been shown and examined as state-like constructs that vary from day to day (Beal, Trougakos, Weiss, & Green, 2006; Fisher, 2000; Fuller, Fisher, Stanton, Spitzmueller, Russell, & Smith, 2003). The aim of our study is to address this research gap and to investigate factors that ''make a creative day.'' Drawing on earlier creativity research, we examine the role of an employee's positive affect (PA) and negative affect (NA) in the morning as well as the role of daily job stressors (time pressure and situational constraints) for daily creativity. In addition, as previous research showed inconclusive results for the affect-creativity and

* Correspondence to: Carmen Binnewies, Institute of Psychology, University of Mainz, Wallstraße 3, D-55099 Mainz, Germany.
E-mail: carmen.binnewies@uni-mainz.de

Received 24 August 2009
Revised 26 September 2010, Accepted 9 October 2010

stressor-creativity relations, we investigate if the general level of job control—the influence that an employee has over his or her work tasks—is a boundary condition (cross-level moderator) in these relations.

Our study contributes to the literature in several ways. First, we investigate the affect-creativity and stressor-creativity link from a within-person perspective. In general, within-person studies focus on different research questions than between-person studies although both approaches often lead to congruent results (*cf*. Ilies, Johnson, Judge, & Keeney, in press). Accordingly, (Cervone, 2005, p. 425) stated ''Numerous writers have explained that within-person and between-person analyses, although they surely may inform one another, nonetheless constitute domains of inquiry that are conceptually distinct.'' Specifically, a within-person study on creativity addresses the question when and under which circumstances a person shows higher versus lower levels of creativity during the day. Between-person studies provide us with knowledge which personality traits or job characteristics lead to higher or lower creativity in general. Considering practical implications of within-person relations, there may be phases (e.g., days) during a project when it is particularly important for an employee to be creative. Thus, knowledge from within-person diary studies is important for designing interventions to raise an employee's creativity on a specific day.

Moreover, within-person studies addressing day-level relations contribute to theory development as they cover a different time frame than between-person studies (*cf*. Judge, Woolf, & Hurst, 2009). For example, the relation between stressors and creativity may differ over shorter and longer time frames. Whereas a certain level of time pressure on a specific day may lead to higher activation on that day and therefore to a higher creativity, constantly experiencing time pressure at work may lead to health impairments over time and thus to lower creativity. Our within-person study using a diary design contributes to the neglected area of investigating short-term effects of affective states and stressors on creativity at work.

Most previous field studies addressing the affect-creativity relation assessed PA and NA as a between-person variable and linked it to the general level of creativity at work (George & Zhou, 2002; Madjar, Oldham, & Pratt, 2002). Although findings from these studies tell us if a person who experiences more or less PA and NA than other persons shows higher or lower creativity at work, they cannot clarify if a person shows higher creativity on days when experiencing more or less PA and NA compared to the person's average experienced affect. To the best of our knowledge, the only exception is the study of Amabile et al. (2005) that focused on the relation between daily PA and creativity. In our study, we will investigate the relation between daily PA and NA experienced in the morning with daily creativity at work.

Our study further contributes to research on the relation between job stressors and creativity. Time pressure is the most prominent job stressor examined as a predictor of creativity. Results from between-person studies addressing this relation (e.g., Amabile, Mueller, Simpson, Hadley, Kramer & Fleming, 2002; Baer & Oldham, 2006; Ohly, Sonnentag, & Pluntke, 2006) showed inconsistent results as negative, positive and curvilinear relations have been found. A diary study investigating main and moderator effects can shed further light on this relation as theoretical considerations of activation theory (Gardner, 1990) and appraisal mechanisms (Lepine, Podsakoff, & Lepine, 2005) may be better reflected and examined in within-person relations within a day compared to between-person studies. These theories propose under which conditions of activation and stress individual performance increases or decreases rather than predicting which persons perform better than others.

In addition to daily time pressure—a typical challenge stressor according to the challenge-hindrance stressor framework (Lepine et al., 2005)—we also investigate daily situational constraints as a typical hindrance stressor when predicting daily creativity. We focused on time pressure and situational constraints as both stressors were shown to predict other dimensions of daily job performance in within-person studies (e.g., Binnewies, Sonnentag, & Mojza, 2009).

Finally, previous research on the relation between affect, specifically NA and job stressors with creativity showed inconsistent results. Accordingly, the meta-analyses of Hammond, Neff, Schwall, and Zhao (in press) and of Byron, Khazanchi, and Nazarian (2010) pointed to the need of searching for moderators in these relations. Based on the theoretical model of situational strength at work (Barrick & Mount, 1993; Mischel, 1977), we propose that the general level of job control functions as a boundary condition in the relation between daily PA, NA, time pressure, and situational constraints with daily creativity.

DOI: 10.1002/job

Affect in the morning and daily creativity

Creativity is defined as the production of novel and useful ideas (Amabile, 1988; Shalley et al., 2004). Ideas are novel when ''they are unique relative to other ideas currently available in the organization'' (Shalley et al., 2004, p. 934), and useful when ''they have potential for direct or indirect value to the organization, either in the short or long term'' (Shalley et al., 2004, p. 934). As creativity involves the generation of ideas it is the precursor of innovation that includes the implementation of ideas (Amabile, 1988; West, 2002). Generating creative ideas can be either part of employees' jobs (e.g., for employees in R&D departments) or can be viewed as extra-role behavior (e.g., for production workers). Accordingly, Unsworth (2001) differentiated between jobs with high or low creative requirements. In this study, we focused on daily creativity of interior architects/designers and thus on a sample with high creative requirements.

In the present study, we examined predictors of daily creativity, i.e., of changes in creativity from day to day. Viewing creativity as a dynamic performance concept involves that within-person changes in creativity over time are considered substantial and meaningful (*cf.* Beal, Weiss, Barros, & MacDermid, 2005). Motowidlo, Borman, and Schmit (1997) pointed out that job performance consists of episodic behavior at work: ''From one perspective, work behavior is a continuous stream that flows on seamlessly as people spend time at work. ... Streams of work behavior are punctuated by occasions when people do something that does make a difference in relation to organizational goals and these are the behavioral episodes that make up the domain of job performance'' (p. 73). Although recent research started to examine daily within-person variations in different job performance dimensions, such as task performance, organizational citizenship behavior and counterproductive behavior (Binnewies et al., 2009; Dalal, Lam, Weiss, Welch, & Hulin, 2009; Ilies, Scott, & Judge, 2006), investigating within-person variation in creativity has so far been neglected. In the following, we propose that how employees feel in the morning, specifically an employee's PA and NA in the morning is related to daily creativity at work.

Previous research demonstrated the important role of employees' affect for work-related attitudes and behavior (Brief & Weiss, 2002; Elfenbein, 2007) including studies using within-person designs (Fisher, 2002; Ilies et al., 2006; Judge, Scott, & Ilies, 2006; Rothbard & Wilk, 2006). According to the circumplex model (Russell, 1980; Russell & Barrett, 1999) affective states can be classified along the two dimensions pleasure–displeasure and degree of activation. Reviewing previous research on affect and creativity, De Dreu and colleagues (Baas, De Dreu, & Nijstad, 2008; De Dreu, Baas, & Nijstad, 2008) showed that activated positive and negative mood states relate stronger to creativity than deactivated mood states. Accordingly, in our study, we examined the two activated affect dimensions PA and NA. Specifically, we focused on PA and NA in the morning when employees start their working day. PA and NA in the morning represent an employees' well-being in the morning reflecting the mood that an employee brings to work from the non-work domain, first experiences at work as well as the anticipation of tasks and events that are planned for that day (Rothbard & Wilk, 2006; Sonnentag, Binnewies, & Mojza, 2008). Prior research has shown that affect in the morning predicts behavior during the day (e.g., Fritz & Sonnentag, 2009; Rothbard & Wilk, 2006).

PA reflects the extent to which a person feels enthusiastic, active, and alert (Watson, Clark, & Tellegen, 1988) and refers to a state of high energy, full concentration, and pleasurable engagement (Watson et al., 1988). NA involves feeling tense, distressed, and angry and is associated with subjective distress and unpleasurable engagement (Watson et al., 1988). Different theoretical models argue for a positive within-person relation between PA and creativity. According to the dopaminergic model of PA, PA is associated with increased dopamine levels which are in turn related to improved processing of different cognitive sets and to a better integrated memory (Ashby, Isen, & Turken, 1999; Isen, Daubman, & Nowicki, 1987). These improved cognitive processes make it more likely to develop and elaborate on creative ideas. In addition, some theories propose that affect has an informational function (Forgas, 1995; Martin, Ward, Achee, & Wyer, 1993; Schwarz & Clore, 1983). PA signals that everything is going well and the situation is safe (Forgas, 1995). In a high PA state information processing is less systematic which prompts divergent thinking, exploring novel ideas, and in the end creativity (Baas et al., 2008).

DOI: 10.1002/job

Based on these theories, we propose that employees show more creativity at work on days when they experience relatively high PA in the morning (compared to their average experienced PA in the morning). PA in the morning signals the employee that there are no problems and triggers cognitive processes that facilitate creative thinking. Besides numerous experimental studies and between-person studies investigating the relation between PA and creativity (for metaanalytic evidence see Davis, 2009; De Dreu et al., 2008; Hammond et al., in press), the diary study of Amabile et al. (2005) showed a positive relation between daily PA and daily creativity.

The relation between NA and creativity is less clear as conflicting theoretical considerations coexist. According to the affect as information approach (Forgas, 1995; Martin et al., 1993; Schwarz & Clore, 1983), NA signals that the current situation is problematic and unsafe which promotes ''a systematic and detailed information-processing style focused on concrete external information'' (Baas et al., 2008, p. 783). Experiencing high NA is associated with lower confidence that one's efforts have been adequate and thus hinders creativity (Martin & Stoner, 1996). However, (De Dreu et al., 2008), argued that NA is related to less cognitive distraction and increased persistence on the task at hand which in turn fosters creativity. Moreover, the affective signal that the situation at hand is problematic in itself is assumed to motivate an employee to find a creative solution to improve the situation (George & Zhou, 2002, 2007).

Related empirical evidence from between-person studies mirrors these conflicting assumptions: Negative as well as positive and null relations have been found in both experimental and field studies (for meta-analyses see Davis, 2009; De Dreu et al., 2008; Hammond et al., in press) pointing out the importance of identifying moderators in this relation. As a consequence, we do not assume a main effect of NA in the morning on daily creativity. To sum it up, we state

Hypothesis 1: Positive affect in the morning will be positively related to daily creativity.

Daily job stressors and daily creativity

Previous studies addressing the relation between job stressors and creativity mainly focused on time pressure (Baer & Oldham, 2006; Janssen, 2000; Ohly et al., 2006) and only used between-person designs. Although Ohly and Fritz (2010) conducted a day-level study, they focused on between-person relationships between stressors and creativity. However, these findings are limited as they only capture relations at a general level and neglect short-term changes in job stressors and creativity. In the present study, we investigated relations between two types of daily job stressors, namely daily time pressure and daily situational constraints with daily creativity. We chose these two types because from the perspective of the challenge-hindrance stressor framework (Lepine et al., 2005) daily time pressure is (up to a certain level) classified as a challenge stressor and daily situational constraints are classified as a hindrance stressor.

Time pressure is the extent to which employees feel they have inadequate time to finish their work tasks or they need to work faster than usual (Baer & Oldham, 2006; Kinicki & Vecchio, 1994). In general, challenge stressors are positively related to performance, because an employee believes that he or she can successfully react to the stressor by increasing effort at work. Specifically, an employee should believe that he or she can deal with a certain level of time pressure on a given day by working harder, faster, or longer that day.

With regard to the relation between daily time pressure and daily creativity, we argue that there will be an inverted U-shape between daily time pressure and daily creativity. We base our arguments on activation theory (Gardner, 1990) and theory of stress appraisal (Lazarus & Folkman, 1984). According to activation theory time pressure is positively related to perceived activation (Gardner, 1990). Furthermore, activation theory posits that an employee is optimally stimulated and fully engaged in his or her work at intermediate levels of activation, i.e., at characteristic levels of activation (Baer & Oldham, 2006; Gardner, 1990). In addition, an intermediate (i.e., characteristic) level of daily time pressure on a given day should be appraised as challenging as fulfilling one's task within a short period of time can be achieved by investing more effort at work (Ohly & Fritz, 2010). Being optimally stimulated, challenged and engaged at work should in turn foster creative idea generation at work (Baer & Oldham, 2006; Ohly & Fritz, 2010).

DOI: 10.1002/job

By contrast, on days when an employee experiences relatively low or high levels of time pressure, he or she experiences activation that deviates from the characteristic level of stimulation which in turn should result into lower task engagement and creativity (*cf*. Gardner, 1990). In addition, if daily time pressure is very high, the employee may no longer appraise the situation as challenging but as threatening because spending more effort might not be sufficient to accomplish one's tasks within a short period of time. In sum, we argue that on days when an employee experiences an intermediate level of daily time pressure he or she should be most creative while he or she should be less creative on days when experiencing low or high levels of time pressure.

With regard to empirical evidence, the between-person studies of Baer and Oldham (2006) and Ohly et al. (2006) found support for an inverted U-shaped relation between time pressure and creativity. Taken together, we state

Hypothesis 2: There will be an inverted U-shaped relation between daily time pressure and daily creativity.

Situational constraints are circumstances beyond an employee's control (Kane, 1997) that can be described as regulation obstacles (Frese & Zapf, 1994) or work barriers (Greiner, Krause, Ragland, & Fisher, 2004). Examples for such circumstances are a supply shortfall, inappropriate equipment and tools, lack of information or unforeseeable crises (Kane, 1997). As situational constraints are obstacles or barriers that make it more difficult or even impossible to reach one's goals they are perceived as threatening (*cf*. Lazarus & Folkman, 1984) and are classified as hindrance stressors (Lepine et al., 2005). Hindrance stressors are proposed to be negatively related to performance, because they are viewed as a threat to accomplish core tasks (Lepine et al., 2005).

In line with the challenge-hindrance stressor framework (Lepine et al., 2005), we argue that a high level of daily hindrance stressors, i.e., a high level of daily situational constraints are related to lower creativity, as the employee has to invest more effort in coping with the stressor but does not increase creativity by doing so. Spending more effort is not sufficient to cope with situational constraints as they are beyond the control of the employee and often cannot be overcome at the same day (e.g., a computer problem). Situational constraints hinder an employee's creativity as removing constraints requires additional effort and interrupts the pursuit of creative work goals (Greiner et al., 2004). On days when an employee is confronted with a relatively high level of situational constraints at work he or she has to spend a lot of effort to deal with the constraints without making progress in accomplishing his or her tasks. Consequently, the employee should be less motivated to be creative and fewer resources, such as energy should be left for developing and elaborating on creative ideas and daily creativity should be lower. In sum, we propose

Hypothesis 3: Daily situational constraints will be negatively related to daily creativity.

The moderating role of job control

Previous findings from between-person studies on the relations between affect and time pressure with creativity are inconclusive as the direction and size largely varies between studies (*cf*. Baas et al., 2008; Davis, 2009; Hammond et al., in press). Therefore, identifying moderators is an important task of current creativity research. Based on theoretical considerations of situational strength at work (Barrick & Mount, 1993; Mischel, 1977), we propose the general level of job control as a moderator in the relation between affect and job stressors with daily creativity.

Job control refers to the degrees of freedom that a workplace provides over sequence, time frame, and content of one's work tasks and is a rather stable characteristic of the workplace and the job (Jackson, Wall, Martin, & Davids, 1993; Parker & Wall, 1998). Job control is important for creativity as it allows employees to experiment in the workplace and thereby enables employees to generate and elaborate on creative ideas at work (Frese, Teng, & Wijnen, 1999; Ohly et al., 2006).

Proposing job control as a cross-level moderator in the relation between daily affect and job stressors with daily creativity, we draw on the theoretical model of situational strength at work (Barrick & Mount, 1993; Mischel, 1977).

DOI: 10.1002/job

According to Mischel (1977), situations at the workplace can be considered either *strong* or *weak*. A strong situation means that there are many demands and pressures to conform that restrict an employee ''in the range of behaviors that she or he may be both willing and able to exhibit'' (Barrick & Mount, 1993, p. 112). In contrast, a weak situation is characterized by few demands and pressures and provides an employee with the freedom to decide which behaviors to undertake and how to execute them. Job control is viewed as an indicator of situational strength in organizational settings (Barrick & Mount, 1993) as job control captures how much the situation constrains (strong situation) versus permits (weak situation) behavior at work.

As argued above daily PA and daily NA in the morning may both ''bring the employee in the right state'' to be creative and motivate an employee to generate creative ideas during the day. However, the situation at work may be an important factor that may promote versus constrain if the employee actually engages in creative actions when experiencing high PA and NA in the morning. Employees with a high level of job control have the opportunity to choose adequate strategies for handling their tasks and reaching their goals (Frese & Zapf, 1994). Therefore, employees with high job control can better capitalize on a high PA state in the morning and should subsequently show higher daily creativity compared to employees with low job control. Consequently, we propose that job control amplifies the positive relation between daily PA in the morning and daily creativity.

As stated above experiencing daily NA may also lead to higher creativity as it increases an employee's persistence on the task and functions as an impetus to generate creative ideas in order to change the suboptimal situation at work. We propose that the positive effect of daily NA only holds for employees with a high level of job control. A high level of job control enables an employee experiencing high NA in the morning to generate and develop creative ideas and to take advantage of the critical way of thinking. In contrast, we expect a negative relation between daily NA and daily creativity for employees with a low level of job control. An employee with low job control should be less motivated to develop creative ideas on days when experiencing high NA in the morning as the workplace constrains the possibilities to be creative. In addition, low job control should signal the employee that he or she has limited options to change the current situation at work and may result into feelings of helplessness when experiencing high NA (Peterson, Maier, & Seligman, 1993). Taken together, we propose the following hypotheses:

Hypothesis 4: Job control will moderate the relation between positive affect in the morning and daily creativity. The relation will be stronger for employees with a high level of job control.

Hypothesis 5: Job control will moderate the relation between negative affect in the morning and daily creativity. The relation will be positive for employees with a high level of job control and negative for employees with a low level of job control.

As described above, experiencing an intermediate amount of time pressure should be related to higher activation and thus higher task engagement which should in turn be related to higher creativity. Low and high levels of time pressure should be related to lower activation and lower task engagement. Taking the role of job control into consideration, we argue that job control (i.e., a strong versus weak situation at work Mischel, 1977) determines the degree to which an intermediate level of time pressure, i.e., higher activation and task engagement actually translate into increased idea generation. A high level of job control, i.e., a weak situation at work offers an employee more action opportunities and enables the employee to better deal with daily time pressure as the employee has more options to rearrange his or her work schedule and to decide how to accomplish a task (Jackson et al., 1993; Mischel, 1977; Parker & Wall, 1998). In addition, job control is associated with higher intrinsic motivation (*cf*. Hackman & Oldham, 1976; Langfred & Moye, 2004). An employee with a high level of job control should be more motivated to develop creative ideas when experiencing an intermediate level of time pressure than an employee with low job control. Accordingly, we propose that the curvilinear relation between daily time pressure and creativity is stronger for employees with high job control. We also expect a curvilinear relation for employees with low job control, but the curvilinear effect should be weaker, i.e., there should be a lower increase of creativity at an intermediate level of time pressure. Employees with low job control have less action opportunities and are less motivated to translate their

DOI: 10.1002/job

optimal level of stimulation into creative idea generation and thus should be less able to capitalize from an intermediate level of activation and challenge that is associated with an intermediate level of time pressure. In sum, we propose

Hypothesis 6: Job control will moderate the inverted U-shaped relation between daily time pressure and daily creativity. The inverted U-shaped relation between daily time pressure and daily creativity will be stronger for employees with high job control.

Considering the relations between daily situational constraints and daily creativity, we argue that job control buffers the negative relation between daily situational constraints and daily creativity. As daily situational constraints are hindrance stressors, they should be negatively related to daily creativity. Job control as a coping resource should help the employee in alleviating the negative effect of situational constraints as is enables the employee to actively counteract the constraints, to choose different action strategies and reorder work tasks (Frese et al., 1999; Jackson et al., 1993). Therefore, the relation between daily situational constraints and daily creativity should be less negative for employees with high job control. Taken together, we state

Hypothesis 7: Job control will moderate the relation between daily situational constraints and daily creativity such that job control will buffer the negative relation between daily situational constraints and daily creativity.

Method

Overview

We used a diary-study design to examine the interplay between daily affect in the morning, daily job stressors and daily creativity at work. Data were collected by a general survey and by daily surveys. All surveys were administered via the internet. First, participants completed the general survey assessing stable variables, i.e., job control and demographic data. Second, during one work week, over five consecutive working days (from Monday to Friday), participants filled out daily surveys twice a day. The first daily survey had to be answered in the morning when participants started work and assessed PA and NA in the morning. The second daily survey was answered in the afternoon, before finishing work and assessed daily situational constraints, daily time pressure, and daily creativity. Participation in the daily surveys started with answering the survey on Monday morning and ended with the survey Friday afternoon.

Sample

Study participants were interior architects/designers. We recruited interior architects by sending an information email containing information about the study and a return form for registration to registered members of the Union of German Interior Architects/Designers (Bund Deutscher Innenarchitekten, BDIA) and by sending study information via the email newsletter of the BDIA. BDIA members include freelance and employed interior designers.

In total, 112 interior designers agreed to participate in the study. For personal reasons, eight people called participation off before completing any questionnaire. The general questionnaire was filled out by 104 interior designers. Date and time of answered daily surveys were recorded. The average time participants submitted the morning survey was 8:21 a.m. ($SD = 1$ hour 36 minutes), the average time participants submitted the afternoon

DOI: 10.1002/job

survey was 16:18 p.m. ($SD = 2$ hours 16 minutes). Questionnaires answered at a wrong time (e.g., when the morning questionnaire was filled out later in the afternoon) or day (e.g., if the Tuesday morning questionnaire was filled out on Wednesday morning) were excluded. Due to missing data and data filled in at the wrong time, 14 participants had to be excluded from analyses.

The final sample consisted of 90 participants with 326 (out of 450 possible) days ($M = 3.6$ days per person). The majority of participants (58.9 per cent) were female. Average age was 41.5 years ($SD = 10.7$). Participants had on average 15.6 years of work experience ($SD = 11.2$) and worked at the current organization for an average of 10.5 years ($SD = 9.5$). On average, participants worked 46.7 hours ($SD = 10.7$) a week on 5.4 days ($SD = 0.7$). A supervisory position was held by 70.0 per cent of our sample, 62.2 per cent were self-employed.

Measures

If not indicated otherwise, all items had to be answered on a five-point Likert scale ranging from ''1 = not at all'' to ''5 = extremely''.

Daily survey data

Daily positive and negative affects in the morning were assessed with 10 items each from the German version (Krohne, Egloff, Kohlmann, & Tausch, 1996) of the PANAS (Watson et al., 1988). Participants had to answer items with respect to how they felt ''at the moment''.[1] Sample items for PA were ''excited'' and ''interested,'' sample items for NA were '' distressed'' and ''upset.'' Cronbach's α was calculated separately for each day and ranged from 0.92 to 0.95 ($M = 0.93$) for PA and from 0.89 to 0.94 ($M = 0.92$) for NA over the five days.

Daily time pressure and *daily level of situational constraints* were assessed in the afternoon survey with five items each of the scales developed by Semmer (1984) and Zapf (1993). A sample item for daily time pressure was ''Today, I was required to work fast at my work'' and for daily situational constraints a sample item was ''Today, I had to work with materials and information that were incomplete and out-dated''. Cronbach's α ranged from 0.91 to 0.95 ($M = 0.93$) for daily time pressure and from 0.75 to 0.90 ($M = 0.82$) for daily situational constraints over the five days.

Daily creativity was assessed in the afternoon survey with eight adjusted items from the scale of Tierney, Farmer, and Graen (1999). All items were adapted to measure the day-specific level of creativity and had to answered on a seven-point Likert scale ranging from 1 = ''not at all'' to 7 = ''extremely''. We dropped one item from the original scale (''Generated ideas revolutionary to our field'') because this item does not capture creative behavior that occurs every day. Sample items were ''Today, I tried out new ideas and approached to problems,'' and ''Today I generated novel, but operable work-related ideas.'' Cronbach's α ranged from 0.90 to 0.93 ($M = 0.90$) over the five days.

In addition to the quantitative creativity rating, we asked participants to write down the most creative idea they had during the day to get an impression of what represents creative ideas in our sample of interior architects. The three ideas that participants rated as highest were: ''Today, me and my employee presented creative design suggestions and first ideas for the butcher shop of the future to the sales management department'', ''Today my best idea was to take alternative materials for the kitchen design into consideration'', ''I could play a positive part and participate in the generation of ideas during the design meeting for a new project''. Examples for ideas on days when medium creativity ratings were obtained were ''I planned a sitting area for kids where they can fit new shoes,'' ''I developed

[1]To test if our measures of morning affect are not only capturing momentary experiences but affective states that persist over the working day, we conducted additional analyses relating PA and NA in the morning to momentary PA and NA measured at the end of the working day. On days when a person experienced more NA in the morning, this person still experienced more NA at the end of the working day ($\beta = 0.197$, $SE = 0.081$, $p < 0.05$) and on days when a person experienced more PA in the morning, this person still experienced more PA at the end of the working day ($\beta = 0.248$, $SE = 0.073$, $p < 0.001$).

DOI: 10.1002/job

the color composition for a corridor.'' On days when participants had lowest ratings of creativity they mostly indicated they had ''no ideas'' and were ''busy with routine tasks.''

General survey data

General level of job control was measured with the five-item scale developed by Semmer (1984) and Zapf (1993). The scale measures method control and a sample item was ''How much can you influence the way how you accomplish your tasks.'' Cronbach's α was 0.77.

Control variables: Age, gender, and supervisory position were assessed with single-item questions as person-level control variables.

Data analyses

We had data from two levels: the person-level (Level 2) and the day-level (Level 1), with day-level data being nested within persons. Thus, we used hierarchical linear modeling techniques to analyze our data (Bryk & Raudenbush, 1992) using the HLM software (Raudenbush, Bryk, & Congdon, 2004). Demographic data and the general level of job control represented Level 2 data. Daily PA, NA, time pressure, situational constraints, and creativity constituted Level 1 data. We centered person-level control variables around the grand mean and day-level predictor variables around the respective person mean. Our outcome variable daily creativity remained uncentered.

Results

Means, standard deviations and correlations are displayed in Table 1. For calculating the correlations between day-level and person-level variables, day-level variables were averaged across the five days. Before testing our hypotheses, we examined if the day-level variance of creativity was substantial. The variance at Level 1 (days) and Level 2 (persons) can be seen in the null model (see Table 2). The variance at Level 2 was 0.883 and at Level 1 it was 1.211. Therefore, the total variance was 2.094, and about 58 per cent (1.211) of the total variance was attributable to within-person variation, whereas 42 per cent (0.883) was attributable to between-person variation.

Table 1. Means, standard deviations, and zero-order correlations between study variables

Variables	Mean	*SD*	1	2	3	4	5	6	7	8
1 Daily positive affect in the morning	3.36	0.81		–0.15**	–0.04	0.11	0.30***			
2 Daily negative affect in the morning	1.24	0.44	–0.23*		0.22***	–0.04	–0.10***			
3 Daily situational constraints in the afternoon	1.66	0.82	–0.11	0.24*		0.26***	0.11*			
4 Daily time pressure in the afternoon	2.39	1.19	0.15	–0.14	0.29**		0.21***			
5 Daily creativity	3.07	1.45	0.42***	–0.18	0.13	0.26*				
6 General level of job control	4.19	0.62	0.10	–0.01	–0.27**	–0.10	0.00			
7 Gender[a]	1.41	0.50	0.24*	–0.13	–0.03	0.05	0.32**	0.27***		
8 Age	41.48	10.68	0.06	–0.18	–0.26*	–0.10	–0.01	0.48***	0.51***	
9 Supervisory position[b]	0.70	0.46	0.08	0.19	–0.26*	–0.07	0.15	0.76***	0.25*	0.48***

Note: Correlations below the diagonal are person-level correlations ($N = 90$). Correlations above the diagonal are day-level correlations ($N = 326$).
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
[a]1 = Female, 2 = Male.
[b]0 = no, 1 = yes.

DOI: 10.1002/job

Table 2. Multilevel estimates for models predicting daily creativity at work

	Null model			Model 1			Model 2			Model 3		
	Estim.	*SE*	*t*	Estim.	*SE*	*t*	Estim.	*SE*	*t*	Estim.	*SE*	*t*
Intercept	3.050	0.118	25.955	2.662	0.130	20.522	2.662	0.130	20.519	2.752	0.139	19.796
Age				–0.028	0.011	–2.584*	–0.028	0.011	–2.589*	–0.030	0.011	–2.729**
Gender				0.955	0.211	4.532***	0.956	0.211	4.536***	0.966	0.210	4.594***
Supervisory position				0.930	0.272	3.425***	0.930	0.271	3.427***	0.943	0.271	3.479***
General level of job control (JC)				–0.481	0.278	–1.736	–0.482	0.277	–1.738	–0.449	0.280	–1.605
Positive affect in the morning							0.259	0.126	2.061*	0.244	0.128	1.910
Negative affect in the morning							–0.142	0.196	–0.724	–0.148	0.194	–0.763
Daily situational constraints							0.089	0.086	1.030	–0.045	0.150	–0.303
Daily time pressure							–0.044	0.149	–0.295	0.109	0.086	1.267
Squared daily time pressure										–0.166	0.077	–2.149*
Positive affect in the morning * JC												
Negative affect in the morning * JC												
Daily situational constraints * JC												
Daily time pressure * JC												
Squared daily time pressure * JC												
–2*log (lh)			1101.615			1083.146			1077.323			1072.289
Δ –2*log						18.469***			5.823			5.034*
Δ Df						3			4			1
Level 1 Intercept Variance (SE)			1.211 (0.111)			1.203 (0.110)			1.174 (0.108)			1.144 (0.105)
Level 2 Intercept Variance (SE)			0.883 (0.187)			0.673 (0.155)			0.681 (0.155)			0.703 (0.157)

DOI: 10.1002/job

	Model 4			Model 5		
	Estim.	*SE*	*t*	Estim.	*SE*	*t*
Intercept	2.749	0.139	19.771	2.744	0.138	19.945
Age	–0.030	0.011	–2.730**	–0.030	0.011	–2.644**
Gender	0.967	0.210	4.599***	0.972	0.210	4.613***
Supervisory position	0.943	0.271	3.480***	0.963	0.277	3.477***
General level of job control (JC)	–0.450	0.415	–1.085	–0.340	0.284	–1.196
Positive affect in the morning	0.220	0.138	1.601	0.190	0.129	1.467
Negative affect in the morning	–0.051	0.189	–0.268	–0.066	0.191	–0.346
Daily situational constraints	–0.138	0.125	–1.109	–0.149	0.124	–1.197
Daily time pressure	0.092	0.090	1.022	0.105	0.091	1.156
Squared daily time pressure	–0.163	0.078	–2.092	–0.122	0.066	–1.860
Positive affect in the morning * JC	0.172	0.265	0.651	0.175	0.252	0.694
Negative affect in the morning * JC	0.450	0.211	2.133*	0.481	0.219	2.190*
Daily situational constraints * JC	–0.618	0.215	–2.867**	–0.624	0.216	–2.888**
Daily time pressure * JC	–0.070	0.174	–0.401	–0.057	0.172	–0.330
Squared daily time pressure * JC				–0.333	0.135	–2.465
–2*log (lh)			1058.031			1053.457
Δ –2*log			14.258***			4.574*
Δ Df			4			1
Level 1 Intercept Variance (SE)			1.077 (0.099)			1.057 (0.097)
Level 2 Intercept Variance (SE)			0.721 (0.157)			0.726 (0.157)

Note: *N* at the person-level = 90. *N* at the day-level = 326.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Test of hypotheses

Results for hierarchical linear models predicting daily creativity can be seen in Table 2. In the null model, the intercept was the only predictor. In Model 1, age, gender, and supervisory position were entered as person-level control variables. In addition, we entered job control into Model 1 to control for the main effect of the moderator. In Model 2, we included daily predictor variables (daily PA in the morning, daily NA in the morning, daily time pressure and daily situational constraints). When testing for curvilinear relations and moderators of curvilinear relations the linear main and moderator effects have to be controlled for (*cf.* Baer & Oldham, 2006). In Model 3, squared daily time pressure was entered to test for the curvilinear effect of time pressure. Model 4 included the four interaction terms of predictor variables and job control to test our moderator hypotheses. Finally, in Model 5 the interaction term of squared daily time pressure and job control was entered to test job control as a moderator in the curvilinear relation between time pressure and creativity.

Considering control variables in Model 1, supervisory position and gender were positively, age was negatively related to daily creativity. While employees having a supervisory position and male employees showed a higher level of daily creativity, older employees showed a lower level of daily creativity. In Model 2, PA in the morning was found to be positively related to daily creativity meaning that on days when an employee experienced relatively high PA in the morning he or she was more creative at work. Daily situational constraints were not related to daily creativity. Daily time pressure (linear effect) was also unrelated to daily creativity. Consequently, Hypotheses 1 was confirmed, while Hypotheses 3 was not supported. Model 3 showed a significant curvilinear effect of daily time pressure on daily creativity. The effect is displayed in Figure 1. As hypothesized daily creativity was highest on days when an employee experienced a medium level of time pressure. Thus, Hypothesis 2 was supported.

Results from Model 4 revealed that job control moderated the relation between daily NA in the morning and creativity and between daily situational constraints and daily creativity. The effects are displayed in Figures 2 and 3. Job control did not moderate the relation between daily PA in the morning and daily creativity. Consequently, Hypothesis 4 was disconfirmed. To further analyze the significant interaction effects, we calculated simple slope tests (Bauer & Curran, 2005; Preacher, Curran, & Bauer, 2006). With regard to job control as a moderator in the relation between daily NA and creativity simple slope tests revealed that for persons with a low level of job control (one standard deviation below the mean) daily NA in the morning was marginally negatively related to daily creativity ($\gamma = –0.326$; $SE = 0.195$; $t = -1.669$; $p < .10$). For persons with a high level of job control (one standard deviation above the mean) daily NA in the morning was not significantly related to daily creativity ($\gamma = 0.225$; $SE = 0.258$; $t = 0.873$; ns). Therefore, Hypothesis 5 was partly supported.

With regard to job control as a moderator in the relation between daily situational constraints and creativity simple slope tests revealed that for persons with a high level of job control (one standard deviation above the mean) daily situational constraints were negatively related to daily creativity ($\gamma = -0.516$; $SE = 0.191$; $t = -2.699$; $p < .01$). For

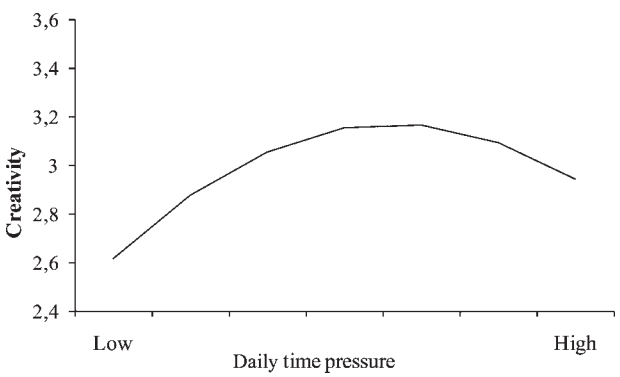

Figure 1. Curvilinear relation between time pressure and daily creativity

DOI: 10.1002/job

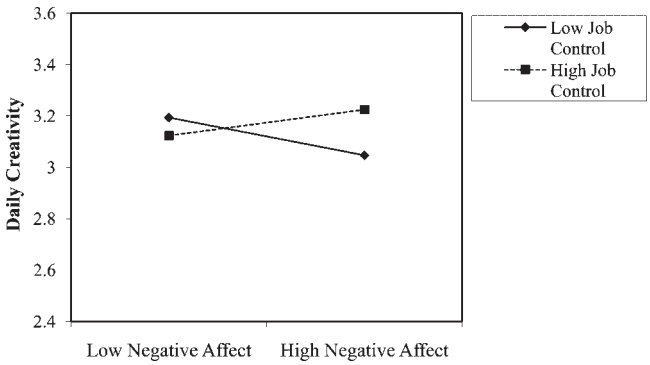

Figure 2. Moderating effect of job control in the relationship between daily negative affect in the morning and daily creativity

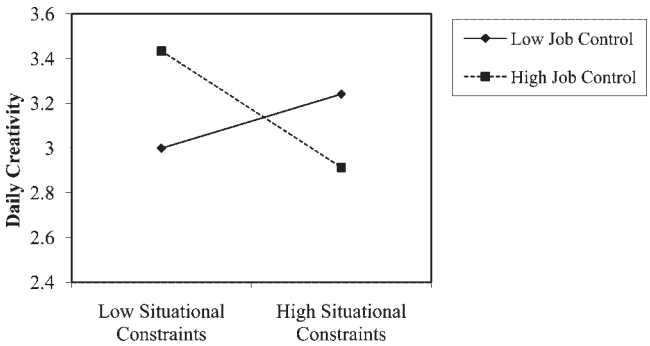

Figure 3. Moderating effect of job control in the relationship between daily situational constraints and daily creativity

persons with a low level of job control (one standard deviation below the mean) daily situational constraints in the morning were not significantly related to daily creativity ($\gamma = 0.240$; $SE = 0.171$; $t = 1.3994$; ns). Thus, Hypothesis 7 was not supported as the interaction did not support a buffer effect of job control.

Model 5 showed that job control moderated the curvilinear relation between daily time pressure and creativity. The interaction effect is displayed in Figure 4. To examine the interaction effect more in detail, we divided our sample in two subgroups including persons with low (i.e., below the median) versus high (i.e., above the median) job control (Aiken & West, 1991). We ran hierarchical linear models for both subgroups to test the curvilinear relation

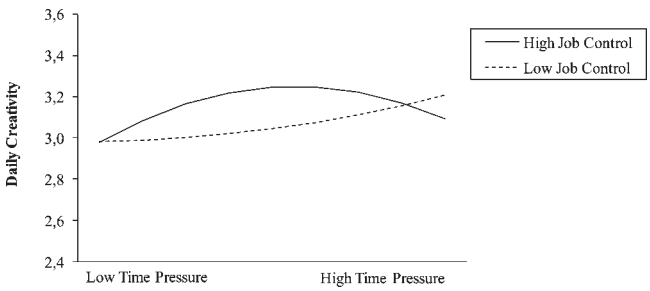

Figure 4. Moderating effect of job control in the relationship between daily time pressure and daily creativity

DOI: 10.1002/job

between daily time pressure and daily creativity (*cf.* Model 3). For persons with high job control, daily time pressure had a curvilinear effect on daily creativity ($\gamma = -0.268$; $SE = 0.104$; $t = -2.587$; $p < .05$), while the linear effect of time pressure was not significant ($\gamma = -0.008$; $SE = 0.110$; $t = -0.073$; ns). Daily creativity was highest on days when an employee experienced a medium level of time pressure. For persons with low job control neither the linear effect of time pressure ($\gamma = 0.194$; $SE = 0.140$; $t = 1.393$; ns) nor the squared time pressure effect was significant ($\gamma = 0.029$; $SE = 0.103$; $t = 0.289$; ns). Consequently, Hypothesis 6 was supported as the curvilinear relationship was stronger for employees with high job control.

Discussion

The goal of our study was examine daily PA and NA in the morning as well as daily time pressure and situational constraints as predictors of daily creativity from a within-person approach. Furthermore, we investigated job control (i.e., situational strength) as a moderator in these relations.

As predicted we found that daily PA in the morning was positively related to daily creativity at work. On days when an employee felt active and enthusiastic in the morning the employee was more creative during the day. This finding is line with results from between-person studies showing positive effects of PA on creativity (Baas et al., 2008; Davis, 2009) and confirmed the finding from Amabile et al.'s (2005) within-person diary study. Also in line with previous between-person research, daily NA in the morning was unrelated to daily creativity. An explanation is that NA both hinders and facilitates creativity (Baas et al., 2008).

In our study, we proposed that job control as an indicator of situational strength at work moderates the relation between daily affect and creativity. Our hypotheses were party confirmed with regard to the NA-creativity relation. Results showed that for employees with low job control daily NA in the morning was negatively related to daily creativity. This is in line with our assumption that a low level of job control constrains and discourages an employee in capitalizing from affective states promoting creativity. However, high job control did neither result into a positive relation between daily NA and creativity nor did it amplify the positive relation between daily PA and daily creativity. A high level of job control seems not to be sufficient to take more advantage of PA as a creativity-promoting affective state. Other moderators that signal an employee that he or she has the abilities (e.g., a creative personality; Madjar et al., 2002) or high role breadth and environmental support (e.g., support from co-workers and supervisors Madjar et al., 2002) to generate creative ideas may be more important and enable an employee to capitalize on high NA and PA in the morning and increase daily creativity.

Regarding relations between daily job stressors and daily creativity, we found support for an inverted U-shaped relation between daily time pressure and daily creativity and thereby confirmed results from the between-person study of Ohly et al. (2006). However, as this study is the first within-person on this relation, we cannot conclude if a curvilinear relation generalizes to all within-person studies. In addition, the curvilinear relation was moderated by job control such that the curvilinear relation between daily time pressure and creativity was stronger for employees with high job control. The curvilinear effect of time pressure was not significant for employees with low job control and we also found no support for a linear effect of time pressure. In sum, time pressure did not matter for daily creativity of employees with low job control. Our findings support assumptions from activation theory and theory on challenge appraisal that a medium (i.e., characteristic) amount of time pressure is optimal for an employee's daily creativity as it is associated with an optimal level of stimulation (Gardner, 1990; Lazarus & Folkman, 1984). However, this relation is only valid for employees with high job control, i.e., for employees whose workplace increases intrinsic motivation and gives them action opportunities to deal with daily time pressure (Frese et al., 1999; Hackman & Oldham, 1976).

With regard to the relation between daily situational constraints and daily creativity our hypotheses were not supported. Daily situational constraints were not negatively related to daily creativity as hypothesized. We found job

DOI: 10.1002/job

control to moderate the relation between daily situational constraints and daily creativity but the relation did not support a buffer effect as we hypothesized. For employees with high job control daily situational constraints were negatively related to daily creativity while there was no relation for employees with low job control. An explanation may be that employees with high job control engage in counteracting and removing situational constraints when faced with them and these efforts reduce the time and energy an employee has left for generating creative ideas. Thus, future research should simultaneously examine different outcome variables, such as creativity, proactive behavior and task performance as increased engagement in one work behavior may be at the expense of decreased engagement in other work behaviors.

Our study contributes to research on creativity as it is one of first examining predictors of within-person changes in creativity. Investigating relations between daily affective states and job conditions with daily creativity is an important step in research as the findings help us in understanding what factors promote or hinder employees to engage in creative behaviors on a day-to-day basis. By assessing predictors and outcomes on a daily level, we were able to collect field data close to the actual experience and behavior of generating creative ideas at work.

Limitations

We would like to point to several limitations of our study. First, we assessed daily creativity by self-reports. One might argue that self-report measures of creativity are biased in terms of social desirability or self-serving bias. However, we took several steps when designing our study and analyzing our data to minimize such biases. First, we predicted daily variations in daily creativity within persons and were not interested in between-person differences, i.e., in the absolute level of creativity. Biases, such as self-serving bias should influence the absolute level of performance and should be attributable to between-person variation and not within-person variation. Second, in our analyses, we centered daily (Level 1) predictors around the respective person mean. By this procedure between-person variance is eliminated from daily predictor variables and interpretations based on differences between persons can be ruled out (Ilies, Schwind, Wagner, Johnson, DeRue, & Ilgen, 2007).

A second limitation of our study is that all of our measures are based on self-reports of the same person and thus common method variance might be a problem (Podsakoff, MacKenzie, Jeong-Yeon, & Podsakoff, 2003). We tried to minimize this problem by temporally separating the measurement of our predictor and outcome variables whenever possible (Podsakoff et al., 2003). Specifically, we assessed job control and control variables in the general survey, daily PA and NA in the daily morning survey and daily job stressors and creativity in the daily afternoon survey.

Nevertheless, future studies should try to assess data on daily creativity by other sources. However, collecting ratings from supervisors or peers may not be feasible as they are in most cases not able to observe and evaluate changes in creativity from day to day. Such ratings are probably not more valid than self-reports because they might be susceptible to biases. Therefore, research should search for alternative strategies of data collection. For example, Amabile et al. (2005) instructed participants in their diary study to write down an ''outstanding event'' that occurred during the day. The free-format answers were categorized according to the content and in the answers which fell into the category of creative behavior were the basis for their measure of creativity.

We chose to assess daily PA and NA as momentary states in the morning and related those states to daily creativity. Although our data showed that PA and NA in the morning are related to PA and NA at the end of the day, future studies may aim at assessing PA and NA over the course of the day to examine if PA and NA experienced at work during the day are related to daily creativity.

In addition, the variance of our daily NA measure was rather constrained ($M = 1.24$, $SD = .44$). Although this is in line with other diary studies assessing state NA with the PANAS (e.g., Ilies et al., 2007) and with other between-person studies addressing the affect- creativity relation (e.g., George & Zhou, 2002, 2007) future research could use implicit measures or physiological measures of state NA to overcome problems related to self-reports (Ilies, Dimotakis, & Watson, 2010).

DOI: 10.1002/job

Another limitation of our study is the rather specific sample of interior architects. A high percentage of interior architects is self-employed and does not work regular hours. Furthermore, interior architects represent a sample with high creativity requirements (Unsworth, Wall, & Carter, 2005). Therefore, the degree to which the results can be generalized to other professions, particular to professions with low creativity requirements might be limited.

Finally, we cannot draw final conclusions about the relations between daily affect and job stressors with creativity. Future experimental or intervention studies are needed to clarify causality.

Implications for research and practice

In our view, using a within-person design, for example a diary study to examine state-like predictors of daily creativity is a promising area for future creativity research. Future diary studies may be particularly useful for investigating the mediating processes in the affect-creativity and stressor-creativity relations. Daily activation, challenge appraisals and intrinsic motivation may be investigated as potential mediators (Amabile, 1996; Ohly & Fritz, 2010). Moreover, future diary research could investigate additional predictors of daily creativity, for example daily affective events, such as conflicts with coworkers or positive and negative interactions with customers. In addition to examining daily creativity, one could also investigate episodic creativity, i.e., changes in creativity during one working day and examine its predictors and outcomes.

Although we confirmed job control as a cross-level moderator in some of the relations, future research should aim at identifying further moderators, particularly in the NA-creativity relation. Potential moderators may signal an employee that he or she has the necessary abilities, skills, and environmental support to develop creative ideas at work, such as creative personality (Madjar et al., 2002), role breadth self-efficacy (Parker, 1998), support from supervisors and co-workers (Madjar et al., 2002), or supportive leadership (Shin & Zhou, 2003). Although, we conceptualized and examined job control as person-level moderator in our study, it may also be valuable to examine day-to-day changes in task-related (perceptions of) control as a moderator.

Furthermore, it is important to investigate within-person changes in creativity in samples with low creativity requirements. As creativity is considered as extra-role behavior in such samples, relations and underlying mechanisms between daily affect and stressors with daily creativity may be different compared to professions with high creativity requirements.

Regarding practical implications our study points into two major directions. First, PA in the morning should be fostered as it turned out as a positive predictor of daily creativity. Research on unwinding from daily job stress showed that recovery during leisure time, particularly mastery experiences (i.e., engaging in challenging activities that provide opportunities for learning and success) and sleep are related to increased PA in the morning (Sonnentag et al., 2008). In addition, positive self-instruction may help employees to deliberately put themselves into a positive affective state in the morning (Lange, Richard, Gest, de Vries, & Lodder, 1998). In addition, NA in the morning should be reduced as it is related to lower creativity for employees with low job control. Recovery during leisure time, particularly psychological detachment from work can reduce NA in the morning (Sonnentag et al., 2008).

Second, our findings with regard to daily time pressure and job control emphasize the importance of work design (Parker, 2002). Specifically, we can conclude from our findings that increasing employees' job control and limiting daily-time pressure to an intermediate level—at least on days when generating creative ideas is the main goal—is beneficial for daily creativity at work.

Acknowledgements

This study is based on the diploma thesis of Sarah C. Wörnlein. An earlier version of this manuscript was presented at the 25th Annual Conference of the Society for Industrial and Organizational Psychology, Atlanta, GA.

DOI: 10.1002/job

Author biographies

Carmen Binnewies is junior professor for occupational health psychology at the University of Mainz, Germany. She received her PhD at the University of Konstanz, Germany. Her research interests include 1) creative and proactive behaviors at work, 2) recovery from work-related stress and work-life balance, and 3) emotional labor and emotion regulation at work.
Sarah C. Wörnlein studied psychology at the University of Konstanz, Germany. In her diploma thesis she examined the moderators in the affect-creativity relationship. In her research she is interested in creative behavior at work.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage Publications, Inc.

Amabile, T. M. (1988). A model of creativity and innovation in organizations. In B. M. Staw, & L. L. Cummings (Eds.), *Research in organizational behavior* (Vol. 10, pp. 123–167). Greenwich: JAI Press.

Amabile, T. M. (1996). *Creativity in context: Update to "The social psychology of creativity"*. Boulder, CO: Westview Press.

Amabile, T. M., Barsade, S. G., Mueller, J. S., & Staw, B. M. (2005). Affect and creativity at work. *Administrative Science Quarterly*, *50*, 367–403.

Amabile, T. M., Mueller, J. S., Simpson, W. B., Hadley, C. N., Kramer, S. J., & Fleming, L. (2002). Time pressure and creativity in organizations: A longitudinal field study. *Working Paper*, Harvard Business School, Boston, MA.

Ashby, F. G., Isen, A. M., & Turken, A. U. (1999). A neuropsychological theory of positive affect and its influence on cognition. *Psychological Review*, *106*, 529–550.

Baas, M., De Dreu, C. K. W., & Nijstad, B. A. (2008). A meta-analysis of 25 years of mood-creativity research: Hedonic tone, activation, or regulatory focus? *Psychological Bulletin*, *134*, 779–806.

Baer, M., & Oldham, G. R. (2006). The curvilinear relation between experienced creative time pressure and creativity: Moderating effects of openness to experience and support for creativity. *Journal of Applied Psychology*, *91*, 963–970.

Barrick, M. R., & Mount, M. K. (1993). Autonomy as a moderator of the relationships between the Big Five personality dimensions and job performance. *Journal of Applied Psychology*, *78*, 111–118.

Bauer, D. J., & Curran, P. J. (2005). Probing interactions in fixed and multilevel regression: Inferential and graphical techniques. *Multivariate Behavioral Research*, *40*, 373–400.

Beal, D. J., Trougakos, J. P., Weiss, H. M., & Green, S. G. (2006). Episodic processes in emotional labor: Perceptions of affective delivery and regulation strategies. *Journal of Applied Psychology*, *91*, 1053–1065.

Beal, D. J., Weiss, H. M., Barros, E., & MacDermid, S. M. (2005). An episodic process model of affective influences on performance. *Journal of Applied Psychology*, *90*, 1054–1068.

Binnewies, C., Sonnentag, S., & Mojza, E. J. (2009). Daily performance at work: Feeling recovered in the morning as a predictor of day-level job performance. *Journal of Organizational Behavior*, *30*, 67–93.

Brief, A. P., & Weiss, H. M. (2002). Organizational behavior: Affect in the workplace. *Annual Review of Psychology*, *53*, 279–307.

Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models: Application and data analysis methods*. Newbury Park, CA: Sage.

Byron, K., Khazanchi, S., & Nazarian, D. (2010). The relationship between stressors and creativity: A meta-analysis examining competing theoretical models. *Journal of Applied Psychology*, *95*, 201–212.

Cervone, D. (2005). Personality architecture: Within-person structures and processes. *Annual Review of Psychology*, *56*, 423–452.

Dalal, R. S., Lam, H., Weiss, H. M., Welch, E. R., & Hulin, C. L. (2009). A within-person approach to work behavior and performance: Concurrent and lagged citizenship-counterproductivity associations, and dynamic relationships with affect and overall job performance. *Academy of Management Journal*, *52*, 1051–1066.

Davis, M. A. (2009). Understanding the relationship between mood and creativity: A meta-analysis. *Organizational Behavior and Human Decision Processes*, *108*, 25–38.

De Dreu, C. K. W., Baas, M., & Nijstad, B. A. (2008). Hedonic tone and activation level in the mood-creativity link: Toward a dual pathway to creativity model. *Journal of Personality and Social Psychology*, *94*, 739–756.

Elfenbein, H. A. (2007). Emotion in organizations (Chapter 7). In J. P. Walsh, & A. P. Brief (Eds.), *The academy of management annals*. (Vol. 1, pp. 315–386). New York, NY: Taylor & Francis Group/Lawrence Erlbaum Associates.

DOI: 10.1002/job

Fisher, C. D. (2000). Mood and emotions while working: Missing pieces of job satisfaction? *Journal of Organizational Behavior*, *21*, 185–202.
Fisher, C. D. (2002). Antecedents and consequences of real-time affective reactions at work. *Motivation and Emotion*, *26*, 3–30.
Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin*, *117*, 39.
Frese, M., Teng, E., & Wijnen, C. J. D. (1999). Helping to improve suggestion systems: Predictors of making suggestions in companies. *Journal of Organizational Behavior*, *20*, 1139–1155.
Frese, M., & Zapf, D. (1994). *Action as the core of work psychology: A German approach* In H. C. Triandis, M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology.* (Vol. 4, 2nd ed., pp. 271–340). Palo Alto, CA: Consulting Psychologists Press, Inc.
Fritz, C., & Sonnentag, S. (2009). Antecedents of day-level proactive behavior: A look at job stressors and positive affect during the workday. *Journal of Management*, *35*, 94–111.
Fuller, J. A., Fisher, G. G., Stanton, J. M., Spitzmueller, C., Russell, S. S., & Smith, P. C. (2003). A lengthy look at the daily grind: Time series analysis of events, mood, stress, and satisfaction. *Journal of Applied Psychology*, *88*, 1019–1033.
Gardner, D. G. (1990). Task complexity effects on non-task-related movements: A test of activation theory. *Organizational Behavior and Human Decision Processes*, *45*, 209–231.
George, J. M. (2008). Creativity in organizations (Chapter 9). In J. P. Walsh, & A. P. Brief (Eds.), *The academy of management annals*. (Vol. 1, pp. 439–477). New York, NY: Taylor & Francis Group/Lawrence Erlbaum Associates.
George, J. M., & Zhou, J. (2002). Understanding when bad moods foster creativity and good ones don't: The role of context and clarity of feelings. *Journal of Applied Psychology*, *87*, 687–697.
George, J. M., & Zhou, J. (2007). Dual tuning in a supportive context: Joint contributions of positive mood, negative mood, and supervisory behaviors to employee creativity. *Academy of Management Journal*, *50*, 605–622.
Greiner, B. A., Krause, N., Ragland, D., & Fisher, J. M. (2004). Occupational stressors and hypertension: A multi-method study using observer-based job analysis and self-reports in urban transit operators. *Social Science & Medicine*, *59*, 1081–1094.
Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, *16*, 250–279.
Hammond, M. M., Neff, N. L., Farr, J. L., Schwall, A. R., & Zhao, X. (in press). Predictors of individual level innovation at work: A meta-analysis. *The Psychology of Aesthetics, Creativity, and the Arts.*
Ilies, R., Dimotakis, N., & Watson, D. (2010). Mood, blood pressure, and heart rate at work: An experience-sampling study. *Journal of Occupational Health Psychology*, *15*, 120–130.
Ilies, R., Johnson, M. D., Judge, T. A., & Keeney, J. (in press). A within-individual study of interpersonal conflict as a work stressor: Dispositional and situational moderators. *Journal of Organizational Behavior.*
Ilies, R., Schwind, K. M., Wagner, D. T., Johnson, M. D., DeRue, D. S., & Ilgen, D. R. (2007). When can employees have a family life? The effects of daily workload and affect on work-family conflict and social behaviors at home. *Journal of Applied Psychology*, *92*, 1368–1379.
Ilies, R., Scott, B. A., & Judge, T. A. (2006). The interactive effects of personal traits and experienced states on intraindividual patterns of citizenship behavior. *Academy of Management Journal*, *49*, 561–575.
Isen, A. M., Daubman, K. A., & Nowicki, G. P. (1987). Positive affect facilitates creative problem solving. *Journal of Personality and Social Psychology*, *52*, 1122–1131.
Jackson, P. R., Wall, T. D., Martin, R., & Davids, K. (1993). New measures of job control, cognitive demand, and production responsibility. *Journal of Applied Psychology*, *78*, 753–762.
Janssen, O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behaviour. *Journal of Occupational & Organizational Psychology*, *73*, 287–302.
Judge, T. A., Scott, B. A., & Ilies, R. (2006). Hostility, job attitudes, and workplace deviance: Test of a multilevel model. *Journal of Applied Psychology*, *91*, 126–138.
Judge, T. A., Woolf, E. F., & Hurst, C. (2009). Is emotional labor more difficult for some than for others? A multilevel, experience-sampling study. *Personnel Psychology*, *62*, 57–88.
Kane, J. S. (1997). Assessment of the situational and individual components of job performance. *Human Performance*, *10*, 193–226.
Kinicki, A. J., & Vecchio, R. P. (1994). Influences on the quality of supervisor-subordinate relations: The role of time pressure. *organizational commitment and locus of control. 15*, 75–82.
Krohne, H. W., Egloff, B., Kohlmann, C.-W., & Tausch, A. (1996). Untersuchungen mit einer deutschen Form der Positive and Negative Affect Schedule (PANAS) [Studies with a German version of the positive and negative affect schedule (PANAS)]. *Diagnostica*, *42*, 139–156.
Lange, A., Richard, R., Gest, A., de Vries, M., & Lodder, L. (1998). The effects of positive self-instruction: A controlled trial. *Cognitive Therapy and Research*, *22*, 225–236.
Langfred, C. W., & Moye, N. A. (2004). Effects of task autonomy on performance: An extended model considering motivational, informational, and structural mechanisms. *Journal of Applied Psychology*, *89*, 934–945.
Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.

DOI: 10.1002/job

Lepine, J. A., Podsakoff, N. P., & Lepine, M. A. (2005). A meta-analytic test of the challenge stressor-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal*, *48*, 764–775.

Madjar, N., Oldham, G. R., & Pratt, M. G. (2002). There's no place like home? The contributions of work and nonwork creativity support to employees' creative performance. *Academy of Management Journal*, *45*, 757–767.

Martin, L. L., & Stoner, P. (1996). Mood as input: What we think about how we feel determines how we think. In L. L. Martin, & A. Tesser (Eds.), *Striving and feeling: Interactions among goals, affect, and selfregulation* (pp. 279–301). Mahwah, NJ: Erlbaum.

Martin, L. L., Ward, D. W., Achee, J. W., & Wyer, R. S. (1993). Mood as input: People have to interpret the motivational implications of their moods. *Journal of Personality & Social Psychology*, *64*, 317–326.

Mischel, W. (1977). The interaction of person and situation. In D. Magnusson, & N. S. Endler (Eds.), *Personality at the crossroads: Current issues in interactional psychology* (pp. 333–352). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Motowidlo, S. J., Borman, W. C., & Schmit, M. J. (1997). A theory of individual differences in task and contextual performance. *Human Performance*, *10*, 71–83.

Ohly, S., & Fritz, C. (2010). Work characteristics, challenge appraisal, creativity, and proactive behavior: A multi-level study. *Journal of Organizational Behavior*, *31*, 543–565.

Ohly, S., Sonnentag, S., & Pluntke, F. (2006). Routinization, work characteristics and their relationships with creative and proactive behaviors. *Journal of Organizational Behavior*, *27*, 257–279.

Oldham, G. R. (2003). Stimulating and supporting creativity in organizations. In S. E. Jackson, M. A. Hitt, & A. S. DeNisi (Eds.), *Managing knowledge for sustained competive advantage*. New York: Jossey-Bass.

Parker, S. K. (1998). Enhancing role breadth self-efficacy: The roles of job enrichment and other organizational interventions. *Journal of Applied Psychology*, *83*, 835–852.

Parker S. K. (Ed.), (2002). *Designing jobs to enhance well-being and performance*. New York, NY: Penguin Press.

Parker, S. K., & Wall, T. D. (1998). *Job and work design: Organizing work to promote well-being and effectiveness*. Thousand Oaks: Sage.

Peterson, C., Maier, S. F., & Seligman, M. E. P. (1993). *Learned helplessness: A theory for the age of personal control*. New York: Oxford University Press.

Podsakoff, P. M., MacKenzie, S. B., Jeong-Yeon, L., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*, 879–903.

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, *31*, 437–448.

Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2004). *HLM 6 for windows [Computer software]*. Lincolnwood, IL: Scientific Software International, Inc.

Rothbard, N. P., & Wilk, S. L. (2006). Waking up on the right side of the bed: The influence of emotions on work attitudes and performance. *Paper Presented at the 21st Annual Conference of the Society of Industrial and Organizational Psychology*, Dallas, TX, May 2006.

Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, *39*, 1161–1178.

Russell, J. A., & Barrett, L. F. (1999). Core affect, prototypical emotional episodes, and other things called emotion: Dissecting the elephant. *Journal of Personality and Social Psychology*, *76*, 805–819.

Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology, 45*, 513–523.

Semmer, N. (1984). *Streßbezogene Tätigkeitsanalyse [Stress-oriented analysis task-analysis]*. Weinheim. Beltz.

Shalley, C. E., Zhou, J., & Oldham, G. R. (2004). The effects of personal and contextual characteristics on creativity: Where should we go from here? *Journal of Management*, *30*, 933–958.

Shin, S. J., & Zhou, J. (2003). Transformational leadership, conservation, and creativity: Evidence from Korea. *Academy of Management Journal*, *46*, 703–714.

Sonnentag, S., Binnewies, C., & Mojza, E. J. (2008). ''Did you have a nice evening?'' A day-level study on recovery experiences, sleep and affect. *Journal of Applied Psychology*, *93*, 674–684.

Tierney, P., Farmer, S. M., & Graen, G. B., (1999). An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel Psychology*, *52*, 591–620.

Unsworth, K. L. (2001). Unpacking creativity. *Academy of Management Review*, *26*, 289–297.

Unsworth, K. L., Wall, T. D., & Carter, A. (2005). Creative requirement: A neglected construct in the study of employee creativity? *Group & Organization Management*, *30*, 541–560.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS-scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070.

West, M. A. (2002). Sparkling fountains or stagnant ponds: An integrative model of creativity and innovation implementation in work groups. *Applied Psychology: An International Review*, *51*, 355–387.

Zapf, D. (1993). Stress-oriented analysis of computerized office work. *European Work and Organizational Psychologist*, *3*, 85–100.

DOI: 10.1002/job